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Process for producing hinge-lid boxes

P a t e n t c l a i m s

1. Process for producing (cigarette) packs of the hinge-lid-box type with cross-sectionally round or beveled upright pack edges – round edges (14, 15) or oblique edges – non-folded, planar blanks (10) being pre-shaped with the aid of rounding or beveling tools in the region of the round edges (14, 15) or oblique edges and then being processed in the usual manner for producing the hinge-lid box in a packaging machine (11), **characterized in that** the blanks (10) are deformed to give round edges (14, 15) or oblique edges during continuous transportation, and are shaped back essentially into the planar starting position.
2. Process according to Claim 1, **characterized in that** the pre-shaped, essentially (once again) planar blanks (10) are collected into a blank stack (37), and the blank stack (37), as a unit, is subjected to counter-deformation in respect of the pre-shaped round edges (14, 15) or oblique edges.
3. Process according to Claim 1, **characterized in that**, following the (preliminary) shaping of the round edges (14, 15) or oblique edges, the blanks (10) are deformed back in the opposite direction beyond the planar starting position.

4. Apparatus for producing (cigarette) packs of the hinge-lid-box type with cross-sectionally round or beveled upright pack edges – round edges (14, 15) or oblique edges – it being possible for planar blanks (10) to be pre-shaped with the aid of rounding or beveling tools in the region of the round edges (14, 15) or oblique edges and then to be fed to a packaging machine (11) with folding means for producing the hinge-lid box, **characterized by** a shaping subassembly (13) with an endless conveyor for transporting the blanks (10) during the preliminary shaping, in particular with a rounding turret (18) which, along the circumference, has mounts for in each case one blank (10) and has shaping tools assigned to each mount, it being possible for blanks (10) to be shaped to form the round edges (14, 15) during the preferably continuous rotary movement of the rounding turret (18).

5. Apparatus according to Claim 4, **characterized in that** each securing means for a blank (10), in particular in each case one suction holder (19), is assigned shaping tools arranged on both sides, in particular moveable and rotatable rounding rollers (22, 23) which, together with further shaping tools, shape round edges (14, 15) during the rotary movement of the rounding turret (18).

6. Apparatus according to Claim 4 or 5, **characterized in that** each securing means or each suction holder (19) is assigned shaping members (20, 21) which are arranged on both sides of it and each have a sideways directed rounding (16) corresponding to the shape of the round edge (14, 15) which is to be formed, the rounding rollers (22, 23) shaping the blank (10) around the rounding (16) of the shaping members (20, 21) in the region of the round edges (14, 15).

7. Apparatus according to Claim 6 or one of the further claims, **characterized in that** the shaping members (20, 21) can be moved transversely in a plane parallel to the blank (10) and/or more or less tangentially to the rounding turret (18), in particular can be moved apart from one another in order to deform the blank (10) back into an essentially planar starting position.

8. Apparatus according to Claim 4 or one of the further claims, **characterized in that** the rounding rollers (22, 23) are mounted on holders, in particular on supporting arms (26) which are connected to the rounding turret (18) and can be

moved in the radial direction, and transversely thereto, in order to execute rounding movements.

9. Apparatus according to Claim 4 or one of the further claims, **characterized in that** the blanks (10) can be fed to the rounding turret (18) by a transfer conveyor (29) in the region of a charging station (28), and can be conveyed away by a removal conveyor (35) in the region of a removal station (34), in essentially planar form in each case.

10. Apparatus according to Claim 4 or one of the further claims, **characterized in that**, in the region of the removal station (34), the blanks (10) can be shaped back into the essentially planar starting form by corresponding relative positioning of the rounding rollers (22, 23) and/or of the shaping members (20, 21), in particular in conjunction with the removal conveyor (35).

11. Apparatus according to Claim 4 or one of the further claims, **characterized in that** the blanks (10) can be stacked to form blank stacks (37) in the region of a stacking subassembly (36), the stacking subassembly (36) having an upright stacking tower (38) to which blanks can be fed via an open, top side.

12. Apparatus according to Claim 11 or one of the further claims, **characterized in that** the stacking tower (38) comprises lateral, upright guide walls (39, 40) and at least one (bottom) supporting wall (41, 42) as a rest for the blank stack (37) formed, it being possible for the supporting wall (41, 42) to be drawn laterally out of the stacking tower (38) in order for the blank stack (37) to be conveyed away.

13. Apparatus according to Claim 12 or one of the further claims, **characterized in that** the stacking tower (38) is assigned at least two supporting walls (41, 42) which serve alternately as a bottom boundary or rest for a blank stack (37), it being possible for the respectively bottom supporting wall (41, 42) to be moved downwards with the blank stack (37) in order for the blank stack (37) to be transferred to a removal conveyor, in particular to a conveying shaft (43).

14. Apparatus according to Claim 13 or one of the further claims, **characterized in that** the conveying shaft (43) can be displaced in order for the blank stack (37) to be transported away, in particular it can be displaced in the (horizontal) transverse direction and carries along the blank stack (37) in the process, the

conveying shaft (43) comprising lateral shaft walls (44, 45) with bottom supporting means, namely supporting legs (46), for the blank stack.

15. Apparatus according to Claim 11 or one of the further claims, **characterized in that** the blank stack (37) can be deformed as a whole, in particular with the effect of reverse deformation of the blanks (10), at least one pressure-exerting means, in particular a supporting component (50), acting approximately centrally on the free top side of the blank stack, in the region of the conveying shaft (43), in order to transmit pressure to the blank stack (37), the latter being supported around the border on the underside.

10 16. Apparatus according to Claim 11 or one of the further claims, **characterized in that** the blank stack (37) can be transported away from the conveying shaft (43) by a lifting means (49) with supporting components (50, 51) gripping the blank stack (37) at the top and bottom.
